make them capable of being positively positioned to control the movement of one direction of traffic.

831.05. METHOD OF MEASUREMENT.

The *traffic signal heads* and lamps will be measured by the unit, complete in place, including wiring and all hardware.

831.06. BASIS OF PAYMENT.

The accepted traffic signal heads and lamps, measured as provided above, will be paid for at the contract unit price as follows:

TRAFFIC SIGNAL HEADS ..... EACH

Such payment shall be full compensation for furnishing materials, labor, equipment, and incidentals necessary to complete the work as specified.

SECTION 832
OPTICALLY PROGRAMMED ADJUSTABLE TRAFFIC SIGNAL HEADS

832.01. DESCRIPTION.

This work shall consist of providing and installing optically programmed adjustable traffic signal heads and lamps on various types of supports at locations shown on the Plans in conformance with these Specifications.

832.02. MATERIALS.

The optically programmed adjustable traffic signal head shall permit the visibility zone of the indication to be determined optically and require no hoods or louvers. The projected indication(s) may be selectively visible or veiled anywhere within 15° of the optical axis and shall emanate from a single section. No indication shall result from external illumination nor shall one light unit illuminate a second unit.

(a) **Optical System.**

1. The lamp shall be nominal 75 watt, 120 volt AC, three prong, sealed beam having an integral reflector with stippled cover and an average rated life of at least 6,000 hours.
2. The lamp collar including specular inner surface shall couple the lamp to the diffusing element.
3. The diffusing element may be discrete or integral with the convex surface of the optical limiter. The optical limiter shall provide an accessible imaging surface at focus on the optical axis for objects 900 to 1200 feet (275 to 365 m) distance, and permit an effective veiling mask to be variously applied as determined by the desired visibility zone. The optical limiter shall be composed of heat resistant glass.
4. The objective lens shall be a high resolution planar incremental lens, hermetically sealed within a flat laminant of weather resistant acrylic or approved equal. The lens shall be

symmetrical in outline and may be rotated to any 90° orientation about the axis without displacing the primary image. The optical system shall accommodate projection from a single section of diverse selected indicia to separate portions of the roadway such that only one indication will be simultaneously apparent to any viewer.

5. The projected indication shall conform to ITE chromaticity standards.

(b) **Electrical.** The lamp fixture shall comprise a separately accessible housing and integral lamp support, indexed ceramic socket and self-aligning, quick release lamp retainer. Electrical connection between case and lamp housing shall be accomplished with an interlock assembly which disconnects lamp holder when opened. Each signal section shall include a covered terminal block for clip or screw attachment of lead wires. Concealed copper #18 AWG, stranded and coded wires shall interconnect all sections to permit field connection within any section.

(c) **Photo Controls.** Each signal section shall include integral means for regulating its intensity between limits as a function of individual background illumination. Lamp intensity shall not be less than 97 percent of uncontrolled intensity at 10,760 lux, and shall reduce to 15 percent ± 2 percent of maximum at less than 11 lux. Response shall be proportional and essentially instantaneous to any detectable increase of illumination from darkness to 10,760 lux, and damped for any decrease from 10,760 lux.

The intensity controller shall comprise an integrated, directional light sensing and regulating device interposed between lamp and line wires. It shall be compatible with 60 HZ input and responsive within the range 105 to 135 volts. Output may be phase controlled, but the device shall provide a nominal terminal impedance of 1200 ohms open circuit and a corresponding holding current.

832.04. CONSTRUCTION METHODS.

Die cast aluminum parts shall conform to ITE alloy and tensile requirements and have a chromate preparatory treatment. Finish the exterior of the signal case, lamp housing and mounting flanges with a high quality prime baked enamel and finish paint. Make the lens holder and interior of the case optical flat black. Predrill the signal case and lens holder for backplates and visors. Hinges and latch pins shall be stainless steel. Seal all access openings with weather resistant rubber gaskets. Mount the signal to standard 1 1/2 inch (38 mm) fittings as a single section, as a multiple section face, or in combination with other signals. Provide the signal section with an adjustable connection that permits incremental tilting from 0-20 degrees below the horizontal while maintaining a common vertical axis through couplers and mounting. Mounting attachment shall permit external adjustment about the mounting axis in 5 degree increments. Make the signal mountable and capable of being serviced with ordinary tools. Attachments such as visors, backplates or adapters shall readily fasten to existing mounting surfaces without affecting water and light integrity of the signal. Install, direct, and veil the signal in accordance with manufacturer's instructions. Mask each section of the signal with prescribed materials in an acceptable and workmanlike manner.

832.05. METHOD OF MEASUREMENT.

Optically programmed adjustable traffic signal heads will be measured by the unit complete in place including masking, wiring, and all hardware.

832.06. BASIS OF PAYMENT.

Accept optically adjustable traffic signal heads, measured as provided above, will be paid for at the contract unit price as follows:

OPTICALLY PROGRAMMED ADJUSTABLE TRAFFIC SIGNAL HEADS ..... EACH

Such payment shall be full compensation for furnishing materials, labor, equipment, and incidentals necessary to complete the work as specified.

SECTION 833
TRAFFIC SIGNAL BACKPLATES

833.01. DESCRIPTION.

This work shall consist of furnishing and installing backplates to traffic signal heads in accordance with these Specifications and as shown on the Plans.

833.02. MATERIALS.

Backplates shall meet the requirement of Section 740.

833.04. CONSTRUCTION METHODS.

The backplates shall consist of one piece construction. A two piece backplate may be used for the S-19 signal head. Secure the backplates to the traffic signal heads with noncorrosive machine screws and lock nuts as shown on standard drawings.

833.05. METHOD OF MEASUREMENT.

Backplates will be measured by the unit complete in place.

833.06. BASIS OF PAYMENT.

Accepted backplates, measured as provided above, will be paid for at the contract unit price as follows:

BACKPLATES ..... EACH

Such payment shall be full compensation for furnishing materials, labor, equipment, and incidentals necessary to complete the work as specified.